ORDER NO. ARD82080186C2-09

Service Manual

Mini Cassette
RQ-J20X
(Dark Gray)

This is the Service Manual for the following areas.
D ········· For all European areas.

World's First **dbx**-Equipped
Stereo Cassette Player

Panasonic
dbx
way
Noise Reduction System

RQ-2720 MECHANISM SERIES

Specifications

Power requirements: AC; with optional AC adaptor RP-31
Battery; 3 V (two R6 size dry batteries)
Rechargeable battery; with optional rechargeable battery pack RP-009
Track system: 4-track 2-channel stereo playback with included stereo headphones
Tape speed: 4.8 cm/s
Dynamic range: More than 97 dB (at 1 kHz), with dbx* in
Signal-to-noise ratio: dbx in; 81 dB
dbx out; 56 dB
(A weighted, 3 % THD at 1 kHz)
Fast forward and rewind time: Approx. 120 seconds with C-60 cassette tape
Input: DC in; 3 V
Output: Headphones; output level 630 mV (16 Ω)/CH
Head: 1 LH head for stereo playback
Dimensions: 88.0 mm (W) × 138.0 mm (H) × 27.1 mm (D)
Weight: 340 g, without batteries

Specifications are subject to change without notice
* The term dbx is a registered trademark of dbx Inc.

Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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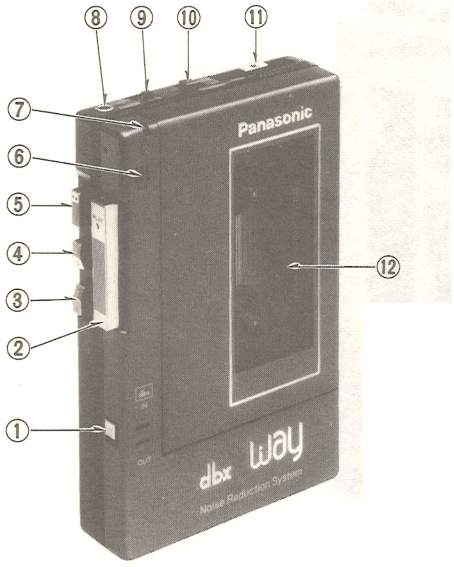
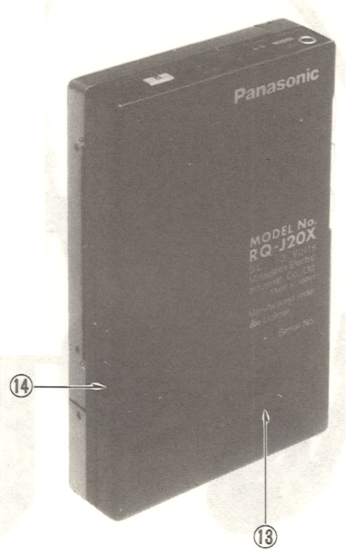
LOCATION OF CONTROLS AND COMPONENTS


⑧
⑨
⑩
⑪
⑦
⑥
⑤
④
③
②
①
⑫
Panasonic
dbx
way
Noise Reduction System


Panasonic
MODEL No. RQ-J20X
⑭
⑬

① dbx IN/OUT switch
② Playback button
③ Fast forward/cue button
④ Rewind/review button
⑤ Stop/eject button
⑥ Built-in microphone
⑦ Battery-check lamp
⑧ Headphones jack
⑨ Tape selector (Metal L/Metal H, Normal L/Normal H)
⑩ Pause/mic on switch
⑪ Volume control
⑫ Cassette compartment cover
⑬ Battery cover
⑭ DC IN jack

DISASSEMBLY INSTRUCTIONS

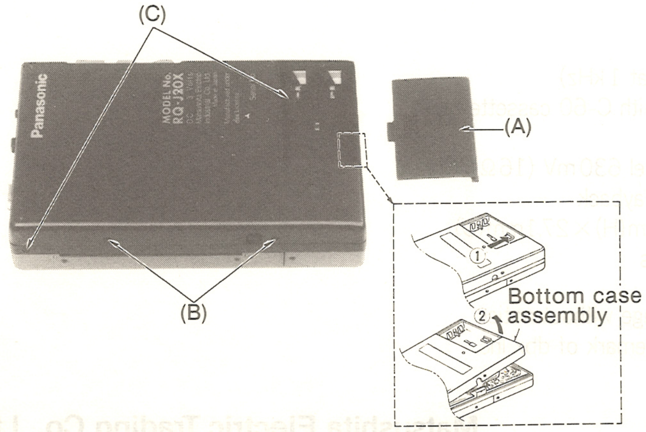

(C)
(A)
(B)
①
②
Bottom case assembly

Fig. 1

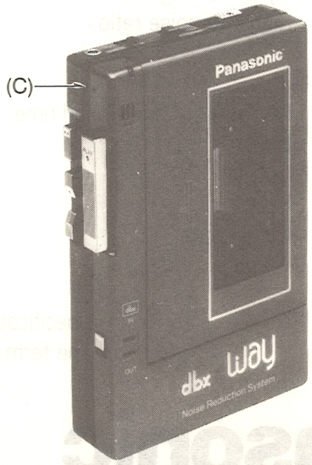

(C)
Panasonic
dbx
way
Noise Reduction System

Fig. 2

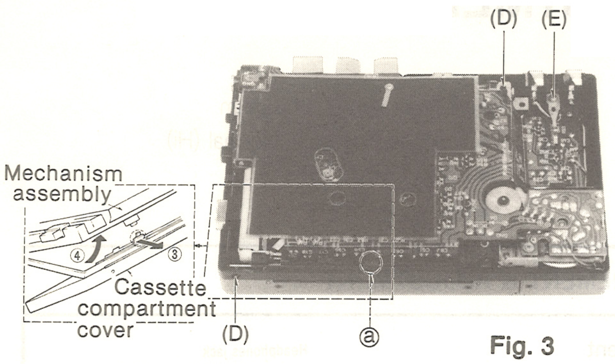

(D)
(E)
Mechanism assembly
④
③
Cassette compartment cover
(D)
ⓐ

Fig. 3

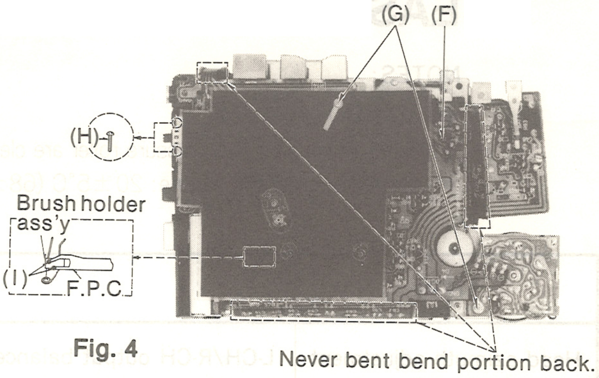

(G)
(F)
(H)
Brush holder ass'y
(I)
F.P.C.
Never bent bend portion back.

Fig. 4

Ref. No.	Procedure	To remove ——	Remove ——	Shown in fig. —— .
1	1	Bottom case assembly	• Battery cover ···························· (A) • 2 screws ···························· (B) • 3 black screws ···························· (C) • As shown in fig. 1, push the claw in the direction of arrow ①, then lift bottom case assembly in the direction of arrow ②.	1 1 1, 2 1
2	1→2	Main case assembly	• 2 screws ···························· (D) • 1 red screw ···························· (E) • First, press the stop/eject button, and open the cassette compartment cover. Press the playback button, and push the mechanical assembly up in the direction of arrow ④ while pulling portion ⓐ in the direction of arrow ③, as shown in Fig. 3. Then, the main case assembly can be removed.	3 3 3
3	1→2→3	Main circuit board and motor governor circuit board	• 1 red screw ···························· (F) • 2 screws ···························· (G) • 2 black screws ···························· (H) • Unsolder the soldered portion of the brush holder assembly ···················· (I)	4 4 4 4

CHIP PARTS REPAIR PROCEDURE

(transistor, diode, resistor and capacitor, etc.)

A. Removal

1. Remove all solder from both ends of chip using a solder sucker (RP8062) or desoldering wick.
2. While the chip is hot remove it by turning with tweezers, as shown in fig. 1.
   * Make sure that the unit is turned OFF when checking the resistance and polarity of a chip.

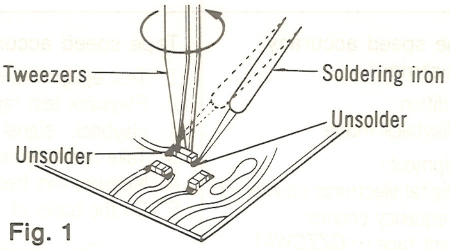

Tweezers
Soldering iron
Unsolder
Unsolder

Fig. 1

B. Mounting

Place solder on the foil chip mounting, and solder the chip while applying the soldering iron in the direction of the arrow, as shown in the diagram (fig. 2).

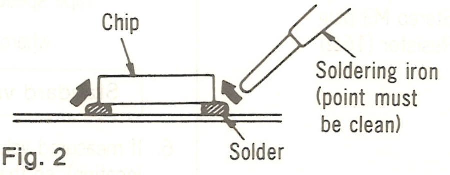

Chip
Soldering iron (point must be clean)
Solder

Fig. 2

C. Precautions in mounting the chip

1. Do not heat the chip beyond 3 seconds.
2. Do not rub the electrode.
3. Use tweezers to prevent any damage to the surface.
4. It is recommended that a pencil-type soldering iron be used.
5. Maintain temperature control under 260°C (500°F) when soldering.
   * Chip resistance (of not more than 100Ω) may vary greatly with the direction of mounting; therefore, mount the white side on the pattern side.
6. Do not re-use the tantalum capacitors or ceramic capacitors after removal (use new components).
7. Do not subject the components (chips) to excessive stress.

MEASUREMENT AND ADJUSTMENT METHODS

NOTES:

- Make sure head is clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20±5°C (68±9°F)
- Volume control: Maximum
- Tape select switch: Normal (Hi)
- Pause switch: OFF
- dbx switch: OUT

<table>
<tr><th>ITEM</th><th>MEASUREMENT & ADJUSTMENT</th></tr>
<tr><td>
Head azimuth adjustment

Condition:
- Playback mode

Equipment:
- VTVM
- Oscilloscope
- Test tape (azimuth) ··· QZZCFM
- Stereo M3 plug
- Resistor (16Ω)
</td><td>
L-CH/R-CH output balance adjustment

1. Make connections as shown in fig. 1 and 2.
2. Playback the 8 kHz signal from the test tape (QZZCFM). Adjust screw (B) in fig. 3 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same time, readjust as follows.
3. Turn the screw shown in fig. 3 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate the angle B between angles A and C, i.e., a point where L-CH and R-CH output levels come together at maximum (Refer to figs. 3 and 4).

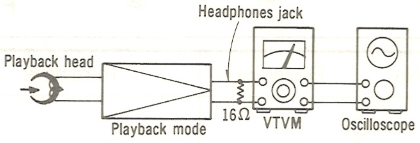

Headphones jack
Playback head
16Ω
VTVM
Oscilloscope
Playback mode

Fig. 1

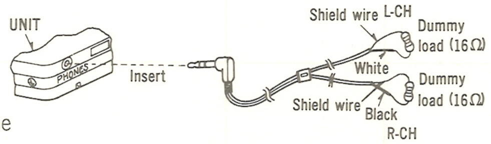

UNIT
PHONES
Insert
Shield wire
L-CH
Dummy load (16Ω)
White
Shield wire
Black
Dummy load (16Ω)
R-CH

Fig. 2

L-CH/R-CH phase adjustment

4. Make connections as shown in fig. 2 and 5.
5. Playback the 8 kHz signal from the test tape (QZZCFM). Adjust screw (B) shown in fig. 3 so that pointers of the two VTVMs swing to maximum and a waveform as illustrated in fig. 6 is obtained on the oscilloscope.

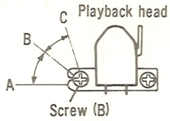

C
Playback head
B
A
Screw (B)

Fig. 3

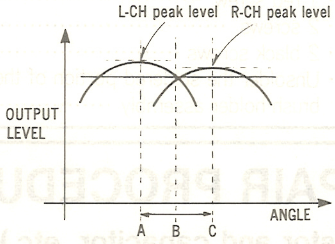


Fig. 4

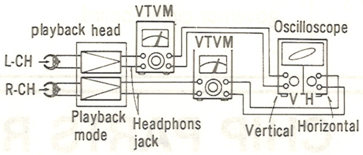

VTVM
playback head
VTVM
Oscilloscope
L-CH
R-CH
V
H
Playback mode
Headphones jack
Vertical
Horizontal

Fig. 5

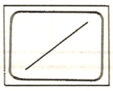


Fig. 6
</td></tr>
<tr><td>
Tape speed accuracy adjustment

Condition:
- Playback mode

Equipment:
- Digital electronic counter or frequency counter
- Test tape ··· QZZCWAT
- Stereo M3 plug
- Resistor (16Ω)
</td><td>
Tape speed accuracy

1. Test equipment connection is shown in fig. 2 and 7.
2. Playback test tape (QZZCWAT 3,000 Hz), and supply playback signal to frequency counter.
3. Take measurement at middle section of test tape.
4. Measure this frequency.
5. On the basis of 3,000 Hz, determine value by following formula:

$$\text{Tape speed accuracy} = \frac{f-3,000}{3,000} \times 100\ (\%)$$

where, f = measured value

Standard value: ±2.5%

6. If measured value is not within standard, adjust tape speed adjustment VR (shown in electrical parts location), so that frequency becomes 3,000 Hz.

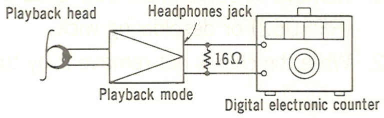

Playback head
Headphones jack
16Ω
Playback mode
Digital electronic counter

Fig. 7
</td></tr>
<tr><td>
Attack recovery time adjustment

Condition:
- Playback mode

Equipment:
- VTVM
- Test tape ··· QZZCFM
</td><td>
1. Test equipment connection is shown in fig. 8.
2. Set dbx switch to IN.
3. Playback the test tape (QZZCFM: 315 Hz/0 dB).
4. Read voltage on VTVM.

Reference value: 15±0.5 mV

5. If measured value is not within reference, adjust VR1 (shown in electrical parts location).

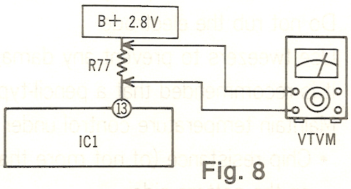

B+ 2.8V
R77
13
IC1
VTVM

Fig. 8
</td></tr>
</table>

ITEM	MEASUREMENT & ADJUSTMENT

Channel balance adjustment

Condition:
- ∗ Playback mode

Equipment:
- ∗ VTVM
- ∗ Test tape ··· QZZCFM

Level difference adjustment for pre-amp and dbx IC (AN6291)

1. Test equipment connection is shown in fig. 9.
2. Set volume control (VR2) to maximum and dbx switch to IN.
3. Playback the test tape (QZZCFM: 315 Hz/0 dB), and using VTVM measure the output level.
4. Perform measurement for both channels.
5. Check that the measured values for both channels are in a range of 22.4 mV (−33 dB) to 31.6 mV (−30 dB), and that the level difference between channels is 3 dB or less.
6. If the measured values do not meet the above requirements, the following adjustment is required. The playback output and level difference between channels of the RQ-J20X can be adjusted by controlling the playback gain of the pre-amp.

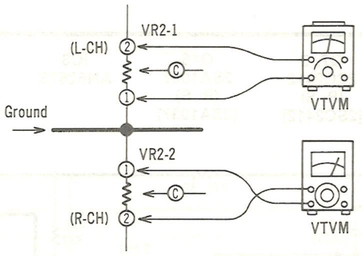


Fig. 9

Procedure:

L-CH and R-CH playback gains change as shown in table 1 according to open/short circuit at connection points Ⓑ, Ⓒ, Ⓓ, Ⓔ, Ⓕ and Ⓖ on the main circuit board (fig. 10).
For level difference adjustment, open or short the connection points by soldering so that the output level difference between L-CH and R-CH is minimal.

Connection point Ⓑ	Connection point Ⓒ	Connection point Ⓓ	R-CH output level
Open	Open	Short	2 dB up
Short	Open	Open	4 dB up
Open	Short	Open	6 dB up
Short	Short	Open	9 dB up

Connection point Ⓔ	Connection point Ⓕ	Connection point Ⓖ	L-CH output level
Open	Open	Short	2 dB up
Short	Open	Open	4 dB up
Open	Short	Open	6 dB up
Short	Short	Open	9 dB up

Table 1

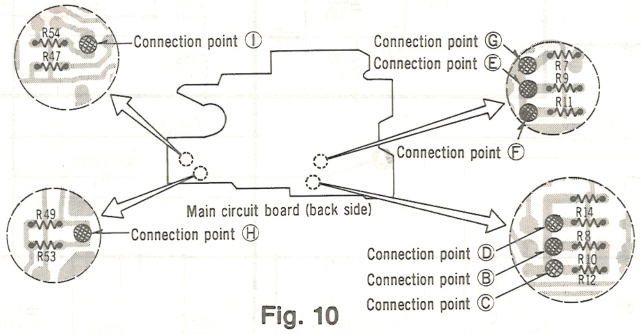


Fig. 10

Channel balance adjustment

Condition:
- ∗ Playback mode

Equipment:
- ∗ VTVM
- ∗ Oscilloscope
- ∗ Test tape ··· QZZCFM
- ∗ Stereo M3 plug
- ∗ Resistor (16 Ω)

Level difference adjustment for headphones-amp

1. Test equipment connection is shown in fig. 1 and 2.
2. Set volume control to 5, tape selection switch to normal (Hi) and dbx switch to OUT.
3. Playback frequency response test tape (QZZCFM), and using VTVM measure the output level at headphones jack.
4. Make measurement for both channels.
5. Check output if level difference between L-CH and R-CH is within 2 dB.
   L-CH output level − R-CH output level = ±2 dB
   If the measurement value do not meet the standard value range, adjust as described below.
6. L-CH and R-CH playback output balance adjustment of RQ-J20X is done by adjusting the gain of the L-CH and R-CH headphones amplifier.

Procedure:

L-CH and R-CH output level changes as shown in table 2 by opening or shorting connection points Ⓗ and Ⓘ on the main circuit board (fig. 10) by soldering. So open or short the connection points so that the output level difference between L-CH and R-CH is minimized.

Connection point Ⓘ	R-CH output level
Open	Up ↕ Down
Short	

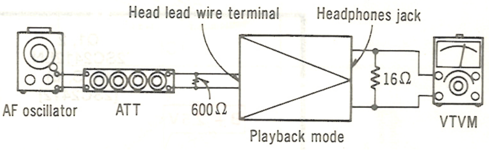
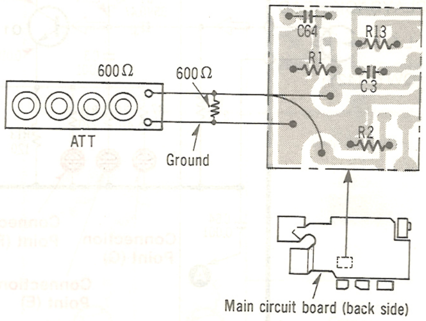
Connection point Ⓗ	L-CH output level
Open	Up ↕ Down
Short	

Table 2

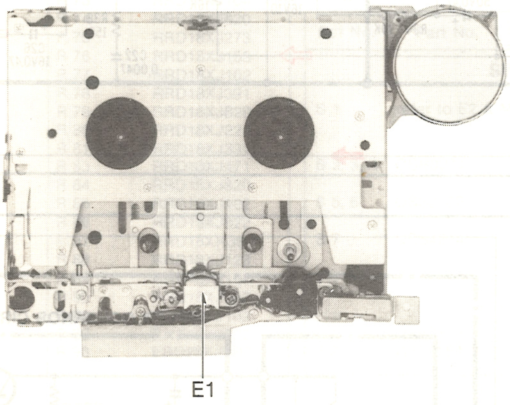
<table>
<tr><th>ITEM</th><th>MEASUREMENT & ADJUSTMENT</th></tr>
<tr>
<td>
Confirmation of dbx decode effect

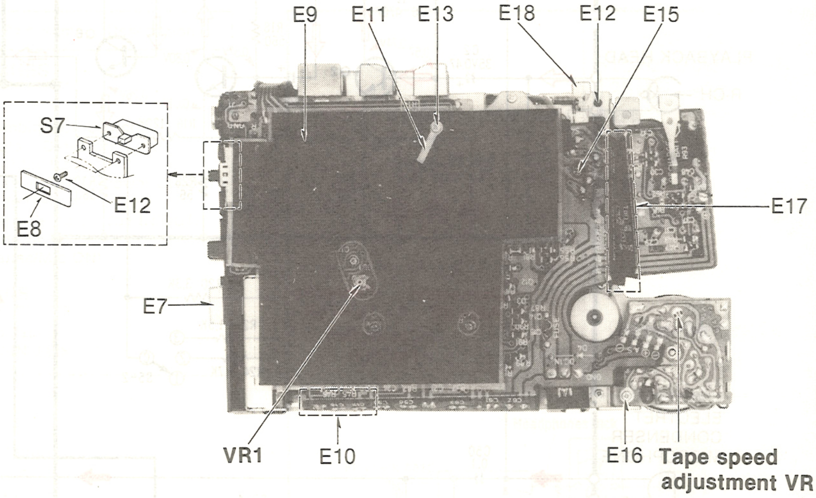
Condition:
* Playback mode

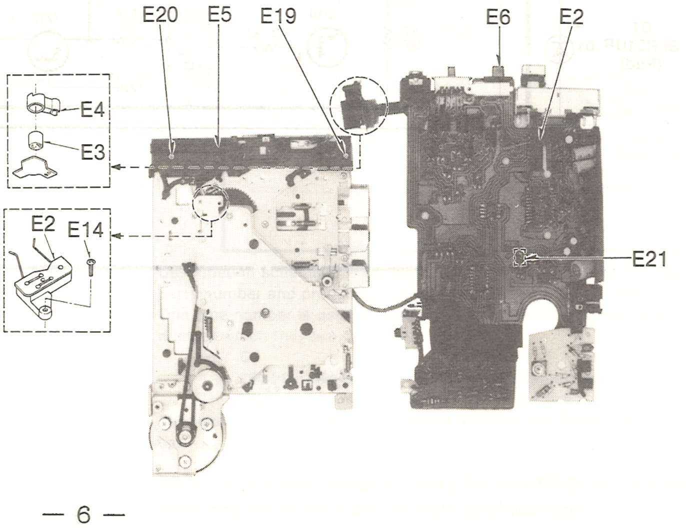
Equipment:
* VTVM * ATT
* AF oscillator
* Stereo M3 plug
* Resistor (16Ω)
</td>
<td>
1. Remove three lead wires of head by desoldering.
2. Test equipment connection is shown in fig. 2 and 11.
3. Set dbx switch to IN.
4. Load a cassette tape (to defeat auto-stop function), and set the unit to playback mode.
5. Supply 315 Hz signal from AF oscillator through ATT (for −78 dB attenuation) to head lead wire terminal (on FPC) (for both channels) as shown in fig. 12.
6. At this time, measure output level, and adjust measured value to 50 mV by adjusting volume control (VR2).
7. Next, attenuate 315 Hz signal by −66 dB and −86 dB, and measure output levels when these signals are inputted.
8. Perform measurement for both channels.
9. Check that the measured values meet the requirements in the dbx decode effect table.

dbx decode effect table
<table>
<tr><th>Input signal</th><th>Measured value</th></tr>
<tr><td>−76 dB (315 Hz)</td><td>0 dB (50 mV)</td></tr>
<tr><td>−66 dB (315 Hz)</td><td>+20±3 dB (500 mV)</td></tr>
<tr><td>−86 dB (315 Hz)</td><td>−20±3 dB (5 mV)</td></tr>
</table>

Head lead wire terminal
Headphones jack
AF oscillator
ATT
600Ω
16Ω
Playback mode
VTVM
Fig. 11

C64
R13
R1
C3
R2
600Ω
600Ω
ATT
Ground
Main circuit board (back side)
Fig. 12
</td>
</tr>
</table>

ELECTRICAL PARTS LOCATION



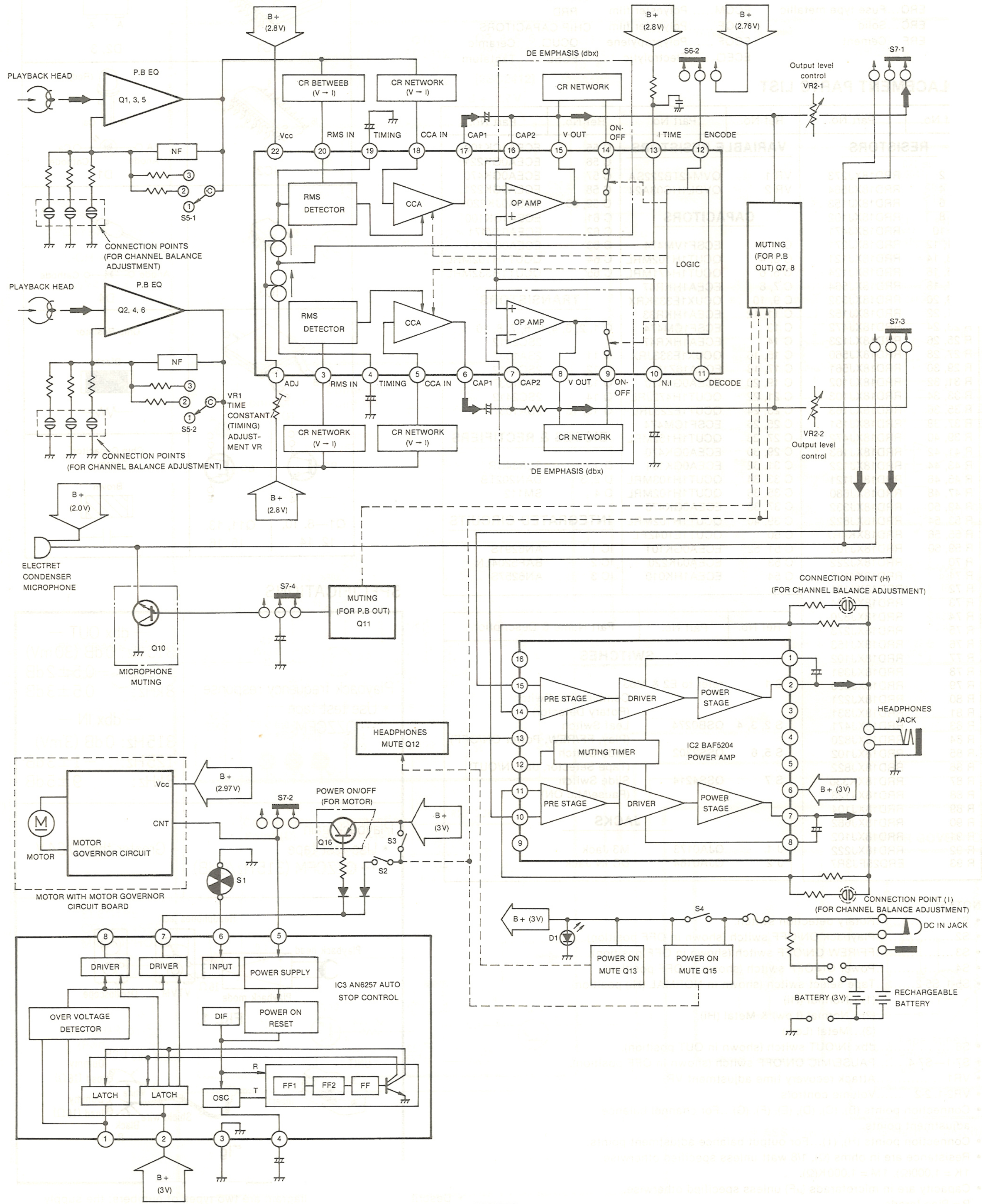

E9
E11
E13
E18
E12
E15
S7
E12
E8
E17
E7
VR1
E10
E16
Tape speed adjustment VR


E20
E5
E19
E6
E2
E4
E3
E2
E14
E21

REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description
		ELECTRICAL PARTS
E 1	QWY4142Y	Playback Head
E 2	QES1533	Brush Holder Assembly
E 3	WM034BZ103	Condenser Microphone
E 4	QKJ0502	Microphone Holder
E 5	QKJ0501	Holder
E 6	QGT1562	Switch Knob (for Pause)
E 7	QYT0639W	Volume Knob
E 8	QQC1735	Shelter
E 9	QTS1590	Shield Plate
E 10	QBH0081	Insulating Sheet
E 11	QTD1258	Lug Terminal
E 12	XQN16+A3FZ	Screw ⊕1.6×3
E 13	XQN16+A35FR	Screw ⊕1.6×3.5
E 14	XQN16+C4FY	Screw ⊕1.6×4
E 15	XTNQ16C4FFR	Screw ⊕1.6×4
E 16	QHQ1320	Step Screw
E 17	QBH0180	Protection Sheet
E 18	QYT0654	Switch Knob (for dbx)
E 19	XTNQ16C28F	Tapping Screw ⊕1.6×2.8
E 20	XTNQ16A3F	Screw ⊕1.6×3
E 21	QTW1242	Insulating Sheet

BLOCK DIAGRAM



PLAYBACK HEAD
P.B EQ
Q1, 3, 5
NF
S5-1
CONNECTION POINTS (FOR CHANNEL BALANCE ADJUSTMENT)
PLAYBACK HEAD
P.B EQ
Q2, 4, 6
S5-2
VR1 TIME CONSTANT (TIMING) ADJUSTMENT VR
B+ (2.8V)
CR BETWEEB (V → I)
CR NETWORK (V → I)
Vcc
RMS IN
TIMING
CCA IN
CAP1
CAP2
V OUT
ON-OFF
I TIME
ENCODE
RMS DETECTOR
CCA
OP AMP
LOGIC
DE EMPHASIS (dbx)
CR NETWORK
ADJ
DECODE
N.I
B+ (2.76V)
S6-2
Output level control VR2-1
S7-1
MUTING (FOR P.B OUT) Q7, 8
S7-3
VR2-2 Output level control
B+ (2.0V)
ELECTRET CONDENSER MICROPHONE
Q10
MICROPHONE MUTING
S7-4
MUTING (FOR P.B OUT) Q11
CONNECTION POINT (H) (FOR CHANNEL BALANCE ADJUSTMENT)
PRE STAGE
DRIVER
POWER STAGE
MUTING TIMER
IC2 BAF5204 POWER AMP
HEADPHONES MUTE Q12
HEADPHONES JACK
B+ (3V)
CONNECTION POINT (I) (FOR CHANNEL BALANCE ADJUSTMENT)
B+ (2.97V)
Vcc
CNT
MOTOR
MOTOR GOVERNOR CIRCUIT
MOTOR WITH MOTOR GOVERNOR CIRCUIT BOARD
S7-2
POWER ON/OFF (FOR MOTOR)
Q16
S3
S2
S1
S4
D1
POWER ON MUTE Q13
POWER ON MUTE Q15
DC IN JACK
BATTERY (3V)
RECHARGEABLE BATTERY
DRIVER
INPUT
POWER SUPPLY
IC3 AN6257 AUTO STOP CONTROL
OVER VOLTAGE DETECTOR
DIF
POWER ON RESET
FF1
FF2
FF
LATCH
OSC
R
T
B+ (3V)

NOTES:

S1……ROTARY SWITCH (ROTATING DETECTION).
S2……PLAYBACK SWITCH (shown in OFF position).
S3……FAST FORWARD/REWIND SWITCH (shown in OFF position).
S4……POWER ON/OFF SWITCH (shown in OFF position).
S5……TAPE SELECT SWITCH ((1) Normal Hi, (2) Normal Low: Metal Hi, (3) Metal Low).
S6……dbx IN/OUT SWITCH (shown in IN position: (4) OUT, (6) IN).
S7……PAUSE & MIC SWITCH (shown in OFF position).
(➡) this arrow indicates the flow of the playback signal.
(- - ➤) this arrow indicates the flow of the control signal.

NOTES: RESISTORS

ERD ...Carbon
ERG ...Metal-oxide
ERS ...Metal-oxide
ERO ...Metal-film
ERX ...Metal-film
ERQ ...Fuse type metallic
ERC ...Solid
ERF ...Cement

CAPACITORS

ECBA ......Ceramic
ECG□ ......Ceramic
ECK□ ......Ceramic
ECC□ ......Ceramic
ECF□ ......Ceramic
ECQM ......Polyester film
ECQE ......Polyester film
ECQF ......Polypropylene
ECE□ ......Electrolytic
ECE□N ...Non polar electrolytic
ECQS ......Polystyrene
ECS□ ......Tantalum
QCS ......Tantalum

CHIP RESISTORS

RRD ......Carbon

CHIP CAPACITORS

QCU□......Ceramic
ECSE ......Tantalum

REPLACEMENT PARTS LIST

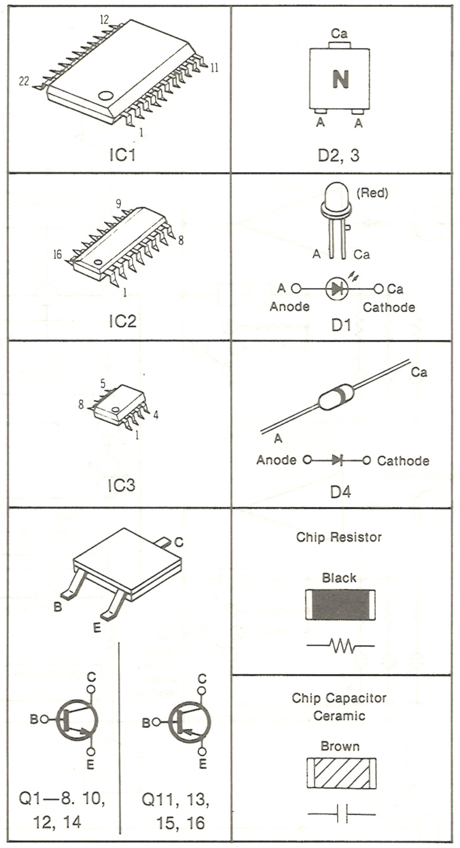
Ref No.	Part No.
RESISTORS	
R 1, 2	RRD18XJ273
R 3, 4	RRD18XJ564
R 5, 6	RRD18XJ153
R 7, 8	RRD18XJ102
R 9, 10	RRD18XJ471
R 11, 12	RRD18XJ271
R 13, 14	RRD18XJ121
R 15, 16	RRD18XJ124
R 17, 18	RRD18XJ564
R 19, 20	RRD18XJ332
R 21, 22	RRD18XJ152
R 23, 24	RRD18XJ472
R 25, 26	RRD18XJ123
R 27, 28	RRD18XJ560
R 29, 30	RRD18XJ561
R 31, 32	RRD18XJ102
R 33, 34	RRD18XJ103
R 35, 36	RRD18XJ163
R 37, 38	RRD18XJ151
R 39, 40	RRD18XJ472
R 41, 42	RRD18XJ163
R 43, 44	RRD18XJ122
R 45, 46	RRD18XJ121
R 47, 48	RRD18XJ680
R 49, 50	RRD18XJ332
R 53, 54	RRD18XJ822
R 55, 56	RRD18XK4R7
R 59, 60	RRD18XJ102
R 70	RRD18XJ222
R 71	RRD18XJ102
R 72	RRD18XJ121
R 73	RRD18XJ104
R 74	RRD18XJ820
R 75	RRD18XJ273
R 76	RRD18XJ153
R 77	RRD18XJ102
R 78	RRD18XJ391
R 79	RRD18XJ820
R 80	RRD18XJ221
R 81	RRD18XJ331
R 83	RRD18XJ471
R 84	RRD18XJ820
R 85	RRD18XJ102
R 86	RRD18XJ822
R 87	RRD18XK330
R 88	RRD18XJ123
R 89	RRD18XJ104
R 90	RRD18XJ682
R 91	RRD18XJ102
R 92	RRD18XJ222
R 93	ERD25FJ3R7
VARIABLE RESISTORS	
VR 1	QVM42TB222SA
VR 2	QVBL1HC03A24
CAPACITORS	
C 1, 2	ECSF1VM474
C 3, 4	QCUT1H102MRL
C 5, 6	QCUT1H471MRL
C 7, 8	ECEA1HKR47
C 9, 10	QCUX1E333KRX
C 11, 12	ECEA1HKR33
C 13	ECSF1CM474
C 14	ECEA1HKR47
C 15, 16	QCUX1E333JRX
C 17, 18	ECEA16Z10
C 19, 20	ECEA0GK470
C 21, 22	QCUT1H472JRL
C 23, 24	QCUT1E223JRL
C 25, 26	ECSF1CM474
C 27, 28	QCUT1H152MRL
C 29, 30	ECEA0GK470
C 31, 32	ECEA0GK101
C 33, 34	QCUT1H103MRL
C 35, 36	QCUT1H102MRL
C 37, 38	ECEA0GK470
C 39, 40	QCUT1H102MRL
C 50	QCUT1E104ZFL
C 51, 52	ECEA0GK101
C 53	ECEA0JK220
C 54	ECEA1HK010
C 55	ECEA1CK100
C 56	ECEA0GK221
C 57	ECEA0GK470
C 58	ECEA0GK221
C 59, 60	ECEA0JK220
C 61	ECEA1CK100
C 62	ECEA0JV471
C 63	ECEA0GK221
C 64	QCUT1H102MRL
C 65	QCUT1H332MRL
TRANSISTORS	
Q 1, 2, 3, 4, 5, 6, 7, 8, 10	2SC2412
Q 11	2SA1037
Q 12	2SC2412
Q 13	2SA1037
Q 14	2SC2412
Q 15, 16	2SA1037
DIODES & RECTIFIERS	
D 1	SLR34UR
D 2, 3	DAN202TB
D 4	SM112
INTEGRATED CIRCUITS	
IC 1	AN6291S
IC 2	BAF5204LN
IC 3	AN6257S

Ref No.	Part No.	Part Name & Description
SWITCHES		
S 1	refer to E2 & M63	Combination Switch (Rotary Detector)
S 2, 3, 4	QSB0274	Leaf Switch (Play, FF/REW, Power ON/OFF)
S 5, 6	QSS2302	Slide Switch (Tape Setector, dbx IN/OUT)
S 7	QSS4214	Slide Switch (Pause/Mic ON)
JACKS		
J 1	QJA0173	M3 Jack
J 2	QJA0164	DC IN Jack

NOTES:

- S1..................Rotary detection switch.
- S2..................Playback ON/OFF switch (shown in OFF position).
- S3..................FF/REW ON/OFF switch (shown in OFF position).
- S4..................Power ON/OFF switch (shown in OFF position).
- S5-1, S5-2.........Tape select switch (shown in NORMAL (Hi) position).
  (1)...Normal (Hi)
  (2)...Normal (Low) & Metal (Hi)
  (3)...Metal (Low)
- S6..................dbx IN/OUT switch (shown in OUT position).
- S7-1—S7-4 ......PAUSE/MIC ON/OFF switch (shown in OFF position).
- VR1 ....Attack recovery time adjustment VR.
- VR2-1, 2-2 ......Volume controls.
- Connection points (B), (C), (D), (E), (F), (G)...For channel balance adjustment points.
- Connection points (H), (I)...For output balance adjustment points.
- Resistance are in ohms (Ω), 1/8 watt unless specified otherwise. 1 K = 1,000(Ω), 1 M = 1,000 K(Ω).
- Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
- All voltage values shown in circuitry are under nosignal condition and volume control at minimum position.
  Unless otherwise specified, voltage measurement conditions are that tape travels is at PLAY, tape mode at NORMAL (Hi), and dbx switch at OUT.
  NO MARK ......Voltage at playback mode.
  ( ) ....Voltage value at IN (dbx switch) mode.
- (⇨) this arrow indicates the flow of the playback signal.
- (➡) this arrow indicates the flow of the talk signal.
- (⇨) this arrow indicates the flow of the playback and talk signal in combination.

TERMINATIONS


12
22
11
1
IC1
Ca
N
A
A
D2, 3
9
16
8
1
IC2
(Red)
A
Ca
A
Ca
Anode
Cathode
D1
5
8
4
1
IC3
Ca
A
Anode
Cathode
D4
C
B
E
C
B
E
C
B
E
Q1—8. 10, 12, 14
Q11, 13, 15, 16
Chip Resistor
Black
Chip Capacitor
Ceramic
Brown

SPECIFICATIONS

Playback frequency response * Use test tape ··· QZZCFM	— dbx OUT — 315 Hz: 0 dB (30 mV) 125 Hz: −0.5±2 dB 8 kHz: 0.5±3 dB — dbx IN — 315 Hz: 0 dB (3 mV) 125 Hz: −1±3 dB 8 kHz: 9±5 dB
Playback gain * Use test tape ··· QZZCFM (315 Hz/0 dB)	Greater than 0.64 V

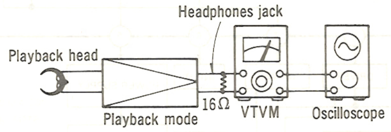

Headphones jack
Playback head
Playback mode
16Ω
VTVM
Oscilloscope

Fig. 1

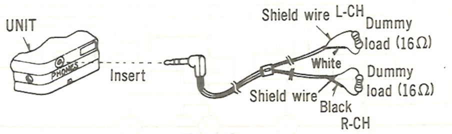
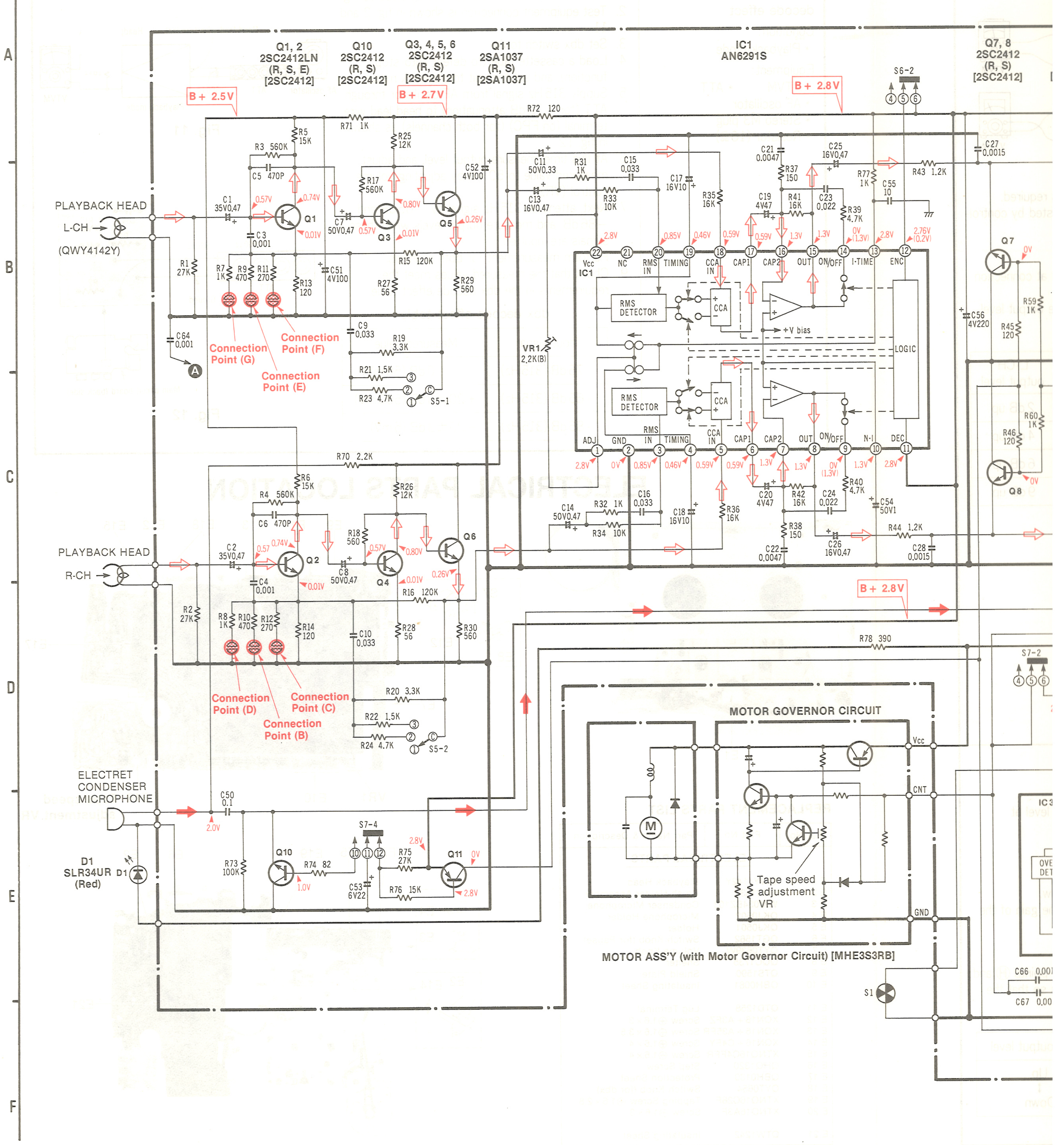

UNIT
Insert
Shield wire
L-CH
Dummy load (16Ω)
White
Dummy load (16Ω)
Shield wire
Black
R-CH

Fig. 2

- Described in schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type number is used for supply parts number and production parts number which they are identical.
  e.g. Q1
  2SC2412LN(R,S,E)——Production parts number
  [2SC2412]————Supply parts number
- **The supply parts number is described alone in the replacement parts list.**

- **This schematic diagram may be modified at any time with the development of new technology.**

SCHEMATIC DIAGRAM


A
B
C
D
E
F
Q1, 2
2SC2412LN
(R, S, E)
[2SC2412]
Q10
2SC2412
(R, S)
[2SC2412]
Q3, 4, 5, 6
2SC2412
(R, S)
[2SC2412]
Q11
2SA1037
(R, S)
[2SA1037]
IC1
AN6291S
Q7, 8
2SC2412
(R, S)
[2SC2412]
B + 2.5V
B + 2.7V
B + 2.8V
S6-2
PLAYBACK HEAD
L-CH
(QWY4142Y)
PLAYBACK HEAD
R-CH
Connection Point (G)
Connection Point (F)
Connection Point (E)
Connection Point (D)
Connection Point (C)
Connection Point (B)
S5-1
S5-2
VR1 2.2K(B)
RMS DETECTOR
CCA
LOGIC
+V bias
Vcc
NC
RMS IN
TIMING
CCA IN
CAP1
CAP2
OUT
ON/OFF
I-TIME
ENC
ADJ
GND
N-I
DEC
ELECTRET CONDENSER MICROPHONE
D1 SLR34UR (Red)
S7-4
S7-2
MOTOR GOVERNOR CIRCUIT
Tape speed adjustment VR
Vcc
CNT
GND
MOTOR ASS'Y (with Motor Governor Circuit) [MHE3S3RB]
S1
IC3
C66 0.001
C67 0.00

Ca
N
A
2, 3
(Red)
Ca
Ca
Cathode
D1
Ca
Cathode
D4
Resistor
lack
apacitor
amic
own

x OUT —
0 dB (30 mV)
−0.5 ± 2 dB
0.5 ± 3 dB
lbx IN —
0 dB (3 mV)
−1 ± 3 dB
9 ± 5 dB

than 0.64 V

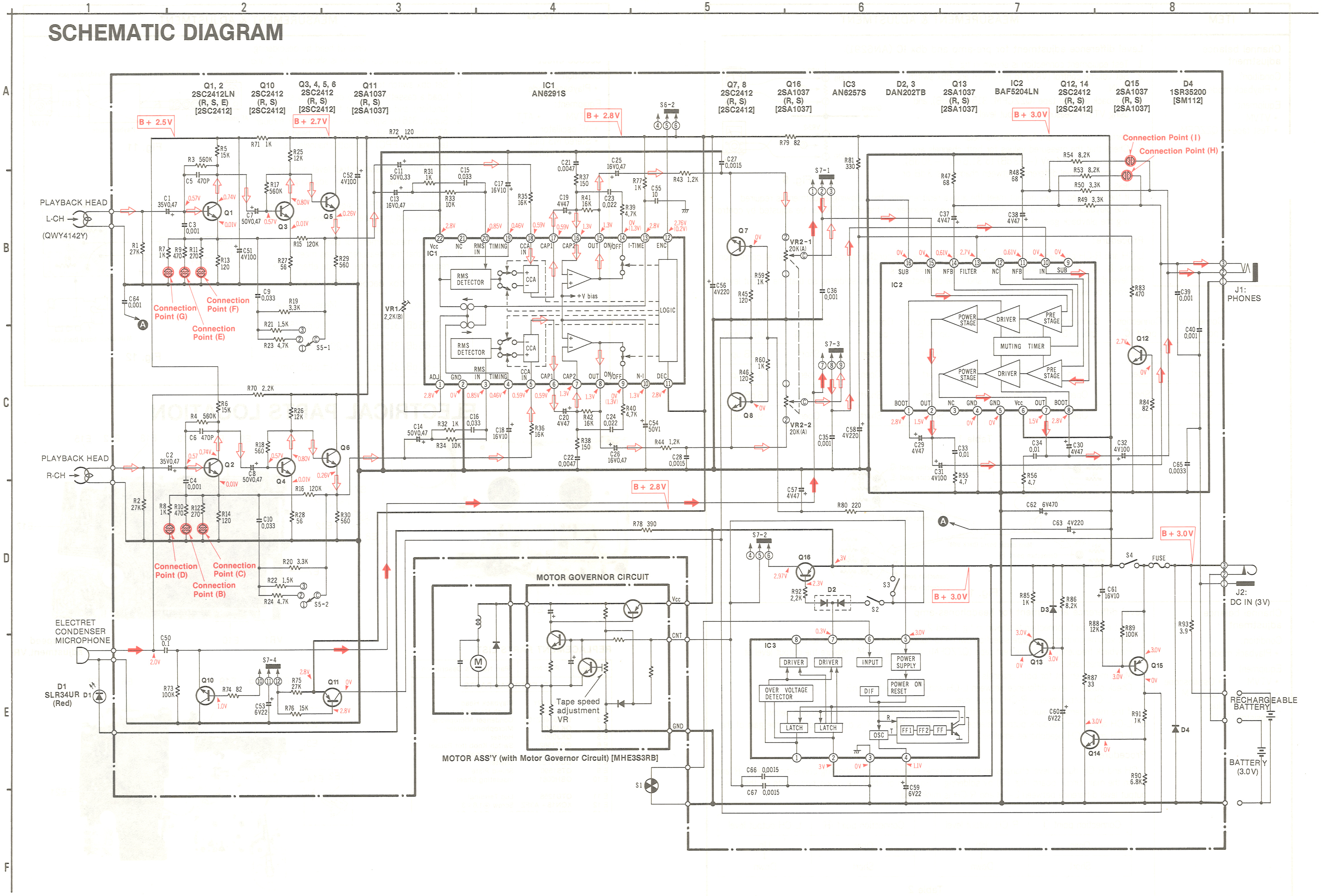
oscope
CH
Dummy load (16Ω)
Dummy load (16Ω)
CH

; the supply
and diodes.
duction parts

ment parts

t any time

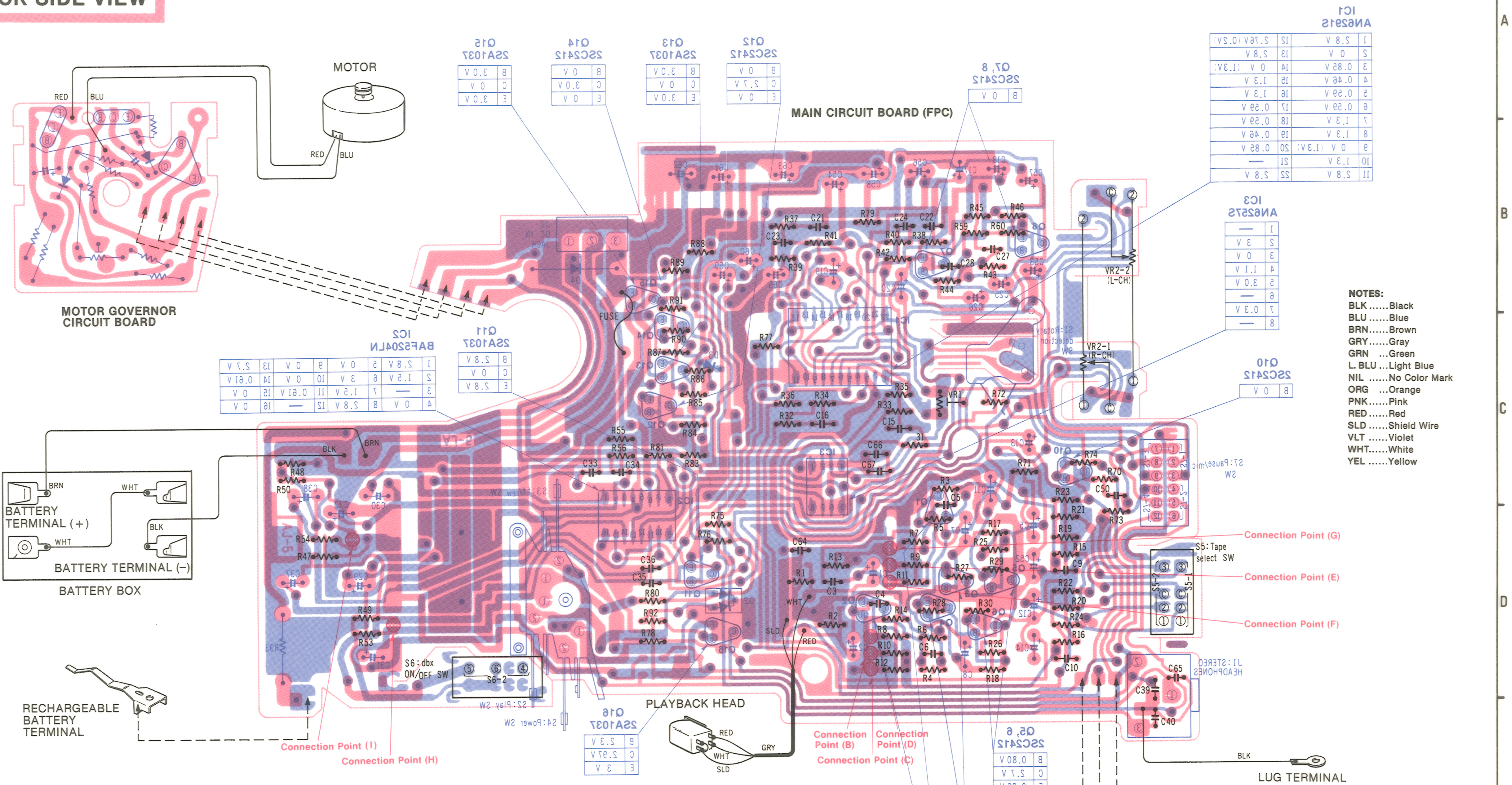
SCHEMATIC DIAGRAM

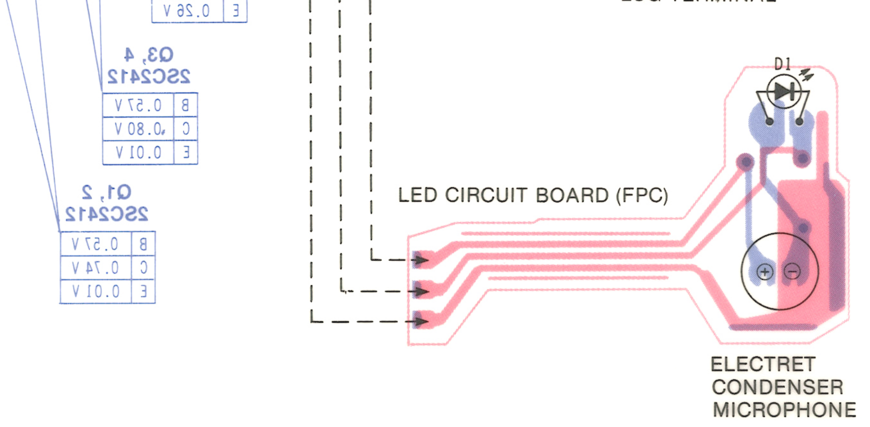


1
2
3
4
5
6
7
8
A
B
C
D
E
F
Q1, 2 2SC2412LN (R, S, E) [2SC2412]
Q10 2SC2412 (R, S) [2SC2412]
Q3, 4, 5, 6 2SC2412 (R, S) [2SC2412]
Q11 2SA1037 (R, S) [2SA1037]
IC1 AN6291S
Q7, 8 2SC2412 (R, S) [2SC2412]
Q16 2SA1037 (R, S) [2SA1037]
IC3 AN6257S
D2, 3 DAN202TB
Q13 2SA1037 (R, S) [2SA1037]
IC2 BAF5204LN
Q12, 14 2SC2412 (R, S) [2SC2412]
Q15 2SA1037 (R, S) [2SA1037]
D4 1SR35200 [SM112]
B+ 2.5V
B+ 2.7V
B+ 2.8V
B+ 3.0V
S6-2
Connection Point (I)
Connection Point (H)
PLAYBACK HEAD
L-CH
(QWY4142Y)
R-CH
Connection Point (G)
Connection Point (F)
Connection Point (E)
Connection Point (D)
Connection Point (C)
Connection Point (B)
S5-1
S5-2
VR1 2.2K(B)
RMS DETECTOR
CCA
LOGIC
+V bias
VR2-1 20K(A)
VR2-2 20K(A)
S7-1
S7-2
S7-3
S7-4
POWER STAGE
DRIVER
PRE STAGE
MUTING
TIMER
J1: PHONES
ELECTRET CONDENSER MICROPHONE
D1 SLR34UR (Red)
MOTOR GOVERNOR CIRCUIT
Tape speed adjustment VR
MOTOR ASS'Y (with Motor Governor Circuit) [MHE3S3RB]
INPUT
POWER SUPPLY
POWER ON RESET
OVER VOLTAGE DETECTOR
LATCH
OSC
FF1
FF2
FF
S1
S2
S3
S4
FUSE
J2: DC IN (3V)
RECHARGEABLE BATTERY
BATTERY (3.0V)

CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

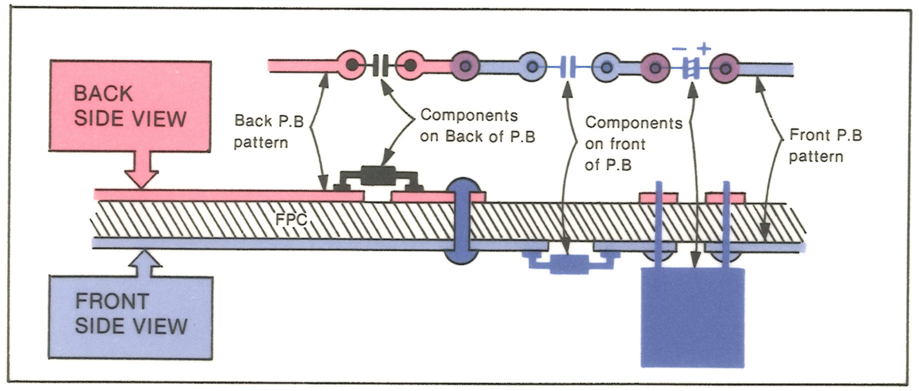
BACK SIDE VIEW


FRONT SIDE VIEW
MOTOR
RED
BLU
MOTOR GOVERNOR CIRCUIT BOARD
MAIN CIRCUIT BOARD (FPC)
FUSE
VR2-2 (L-CH)
VR2-1 (R-CH)
VR1
BATTERY TERMINAL (+)
BATTERY TERMINAL (–)
BATTERY BOX
BRN
WHT
BLK
RECHARGEABLE BATTERY TERMINAL
S6: dbx ON/OFF SW
PLAYBACK HEAD
RED
WHT
GRY
SLD
Connection Point (I)
Connection Point (H)
Connection Point (B)
Connection Point (D)
Connection Point (C)
Connection Point (G)
Connection Point (E)
Connection Point (F)
S5: Tape select SW
LUG TERMINAL
BLK


LED CIRCUIT BOARD (FPC)
D1
ELECTRET CONDENSER MICROPHONE

NOTES:
BLK ......Black
BLU ......Blue
BRN......Brown
GRY......Gray
GRN ...Green
L. BLU ...Light Blue
NIL ......No Color Mark
ORG ...Orange
PNK......Pink
RED......Red
SLD ......Shield Wire
VLT ......Violet
WHT......White
YEL ......Yellow

Example


BACK SIDE VIEW
Back P.B pattern
Components on Back of P.B
Components on front of P.B
Front P.B pattern
FPC
FRONT SIDE VIEW

NOTES:
- The circuit shown in 🟥 on the conductor indicates printed circuit on the back side of the printed circuit board.
- The circuit shown in 🟦 on the conductor indicates printed circuit on the front side of the circuit board, which is put the mechanism unit.
- Components on back of P.B are identified by black symbols.
- Components on front of P.B are identified by blue symbols.
- The symbols (●) snown in the circuit board indicate connection points between conductors on the front side and back side of the circuit board.
- Voltage values shown in ☐ are measured values at the front pattern side of the printed circuit board.
- Values indicates in ☐ are DC voltage betwdeen the chassis and electrical parts.
- All voltage values shown in circuitry are under nosignal condition and playback mode with volume control at minimum position.
  For measurement, use VTVM.
- ( )...Voltage value at IN (dbx switch) mode.

- **This circuit board diagram may be modified at any time with the development of new technology.**

FRONT SIDE VIEW

IC1
AN6291S

1	2.8 V	12	2.76V (0.2V)
2	0 V	13	2.8 V
3	0.85 V	14	0 V (1.3V)
4	0.46 V	15	1.3 V
5	0.59 V	16	1.3 V
6	0.59 V	17	0.59 V
7	1.3 V	18	0.59 V
8	1.3 V	19	0.46 V
9	0 V (1.3V)	20	0.85 V
10	1.3 V	21	—
11	2.8 V	22	2.8 V

IC3
AN6257S

1	—
2	3 V
3	0 V
4	1.1 V
5	3.0 V
6	—
7	0.3 V
8	—

Q10
2SC2412

B	0 V

Q7, 8
2SC2412

B	0 V

Q12
2SC2412

B	0 V
C	2.7 V
E	0 V

Q13
2SA1037

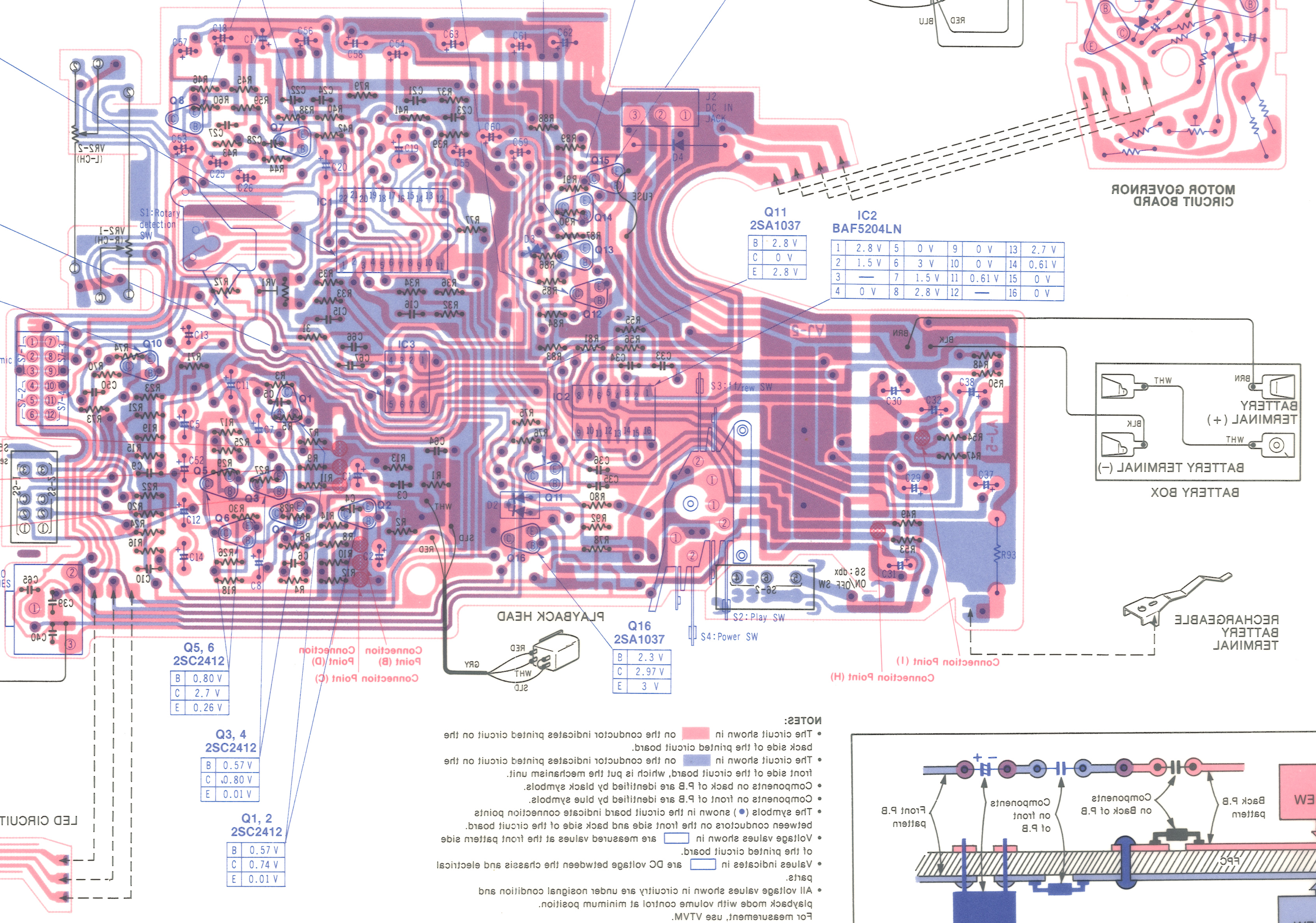
B	3.0 V
C	0 V
E	3.0 V

Q14
2SC2412

B	0 V
C	3.0 V
E	0 V

Q15
2SA1037

B	3.0 V
C	0 V
E	3.0 V


S1: Rotary detection SW
S7: Pause/mic SW
J1: STEREO HEADPHONES
S3: Rew SW
S2: Play SW
S4: Power SW
Q10
IC1
IC3
IC2

Q11
2SA1037

B	2.8 V
C	0 V
E	2.8 V

IC2
BAF5204LN

1	2.8 V	5	0 V	9	0 V	13	2.7 V
2	1.5 V	6	3 V	10	0 V	14	0.61 V
3	—	7	1.5 V	11	0.61 V	15	0 V
4	0 V	8	2.8 V	12	—	16	0 V

Q5, 6
2SC2412

B	0.80 V
C	2.7 V
E	0.26 V

Q16
2SA1037

B	2.3 V
C	2.97 V
E	3 V

Q3, 4
2SC2412

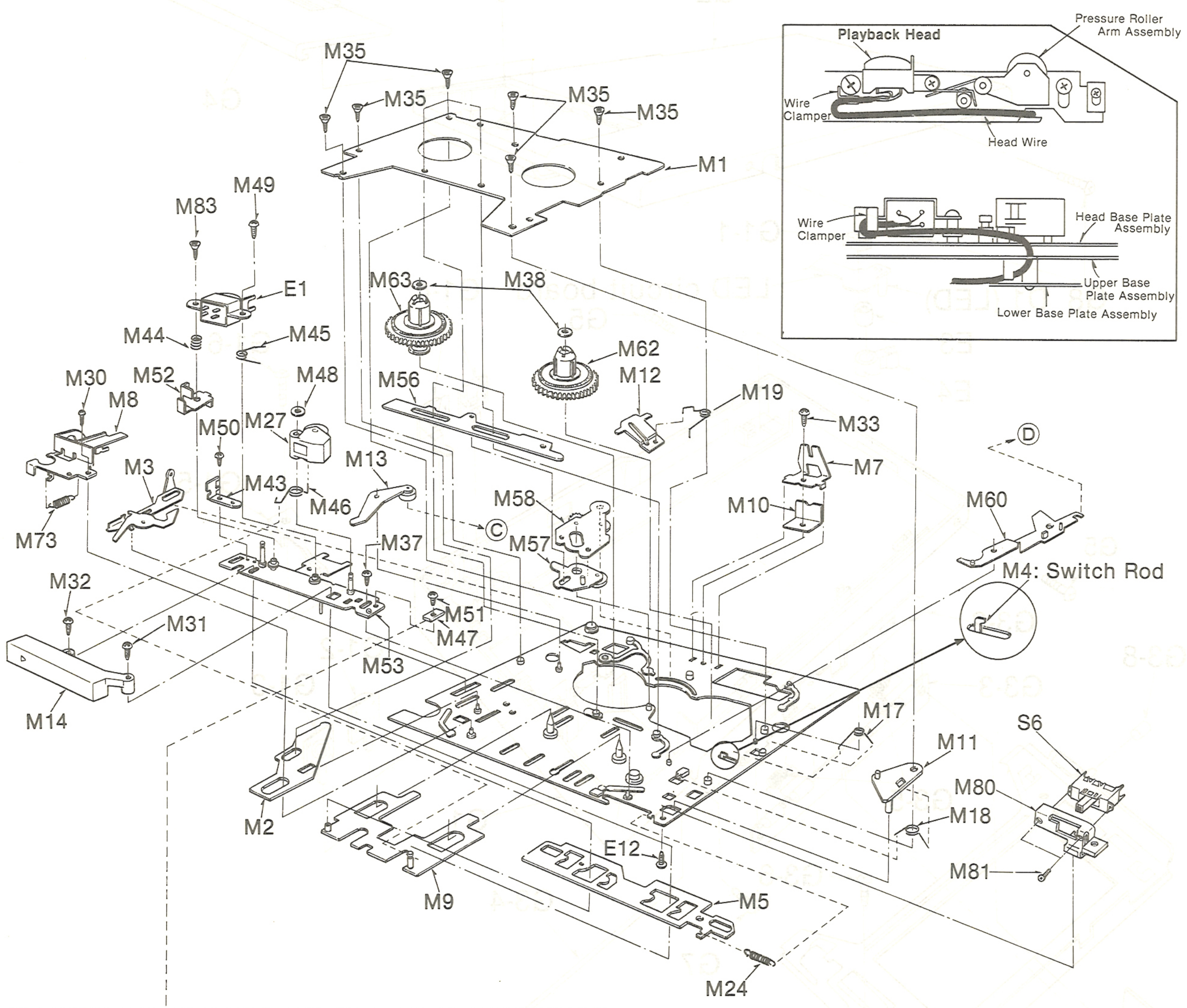
B	0.57 V
C	0.80 V
E	0.01 V

Q1, 2
2SC2412

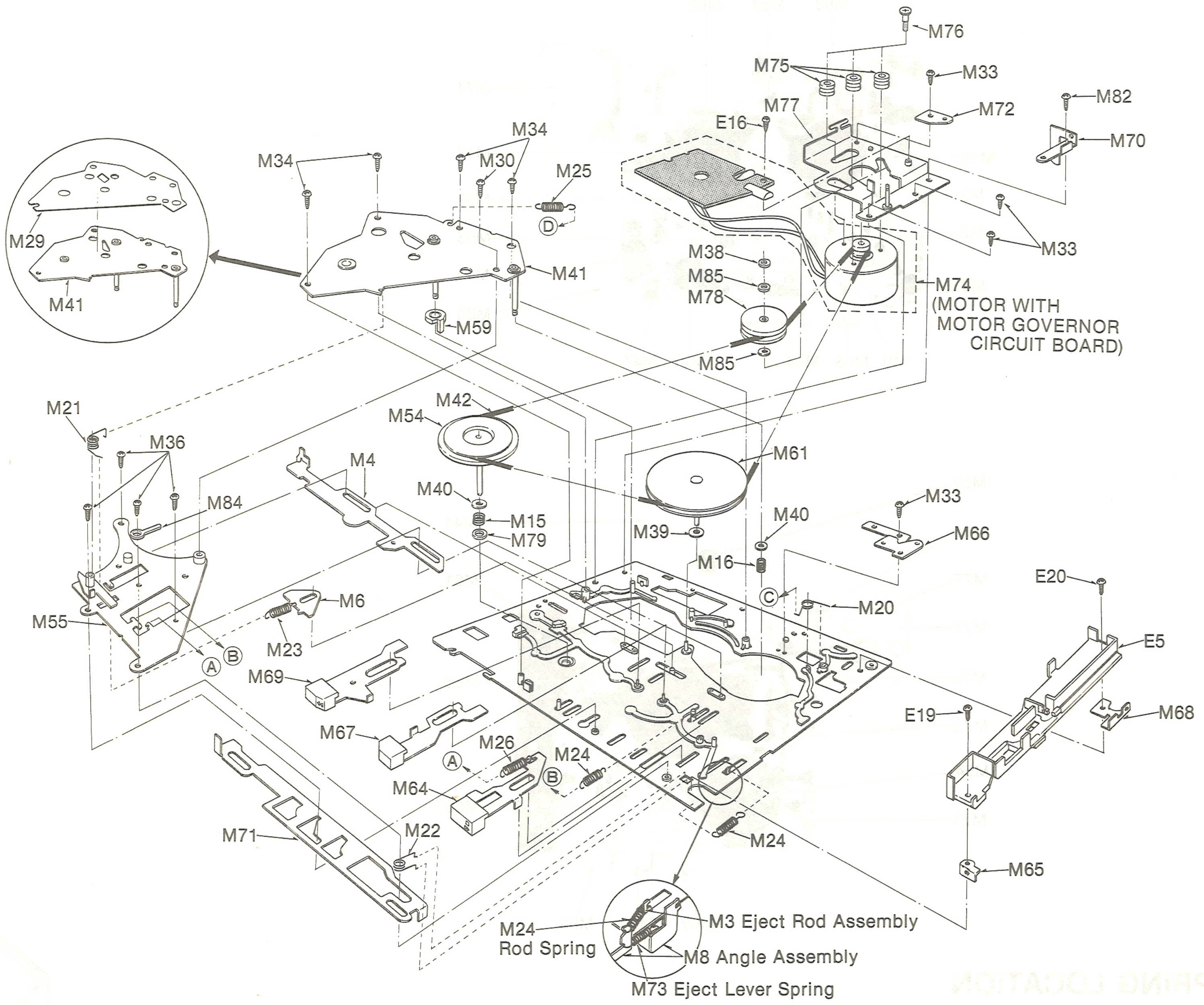
B	0.57 V
C	0.74 V
E	0.01 V

MECHANICAL PARTS LOCATION

(Top View)

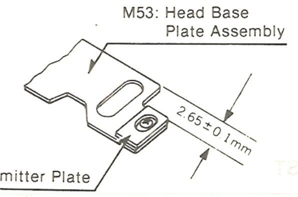

M35
M35
M35
M35
M1
M49
M83
E1
M44
M45
M63
M38
M62
M12
M56
M48
M30
M52
M8
M50
M27
M19
M33
M7
M13
M43
M46
M58
Ⓒ
M57
M10
M60
Ⓓ
M3
M73
M37
M4: Switch Rod
M32
M31
M51
M47
M53
M14
M17
M11
S6
M80
M18
M2
E12
M81
M9
M5
M24
Playback Head
Pressure Roller Arm Assembly
Wire Clamper
Head Wire
Wire Clamper
Head Base Plate Assembly
Upper Base Plate Assembly
Lower Base Plate Assembly

(Rear View)


M76
M75
M33
M77
E16
M72
M82
M70
M34
M34
M30
M25
Ⓓ
M29
M41
M41
M38
M85
M78
M33
M74
(MOTOR WITH
MOTOR GOVERNOR
CIRCUIT BOARD)
M59
M85
M21
M42
M54
M36
M61
M4
M84
M40
M15
M79
M39
M40
M16
M33
M66
E20
Ⓒ
M20
M55
M6
Ⓐ
Ⓑ
M23
M69
E5
E19
M68
M67
M26
M24
Ⓑ
Ⓐ
M64
M22
M71
M24
M65
M24
Rod Spring
M3 Eject Rod Assembly
M8 Angle Assembly
M73 Eject Lever Spring

Adjust the timing

In FF/REW mode, the ON timing of the FF/REW switch (S3) is slightly delayed (compared with gear engagement timming) to prevent generation of mechanical noise. When the limiter plate (M47) is replaced, adjust the timing as shown in the figure.


M53: Head Base Plate Assembly
2.65±0.1mm
M47: Limitter Plate

REPLACEMENT PARTS LIST

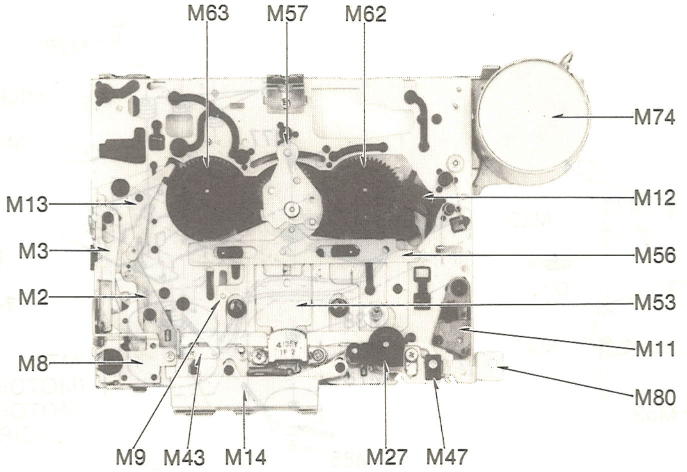
MECHANICAL PARTS

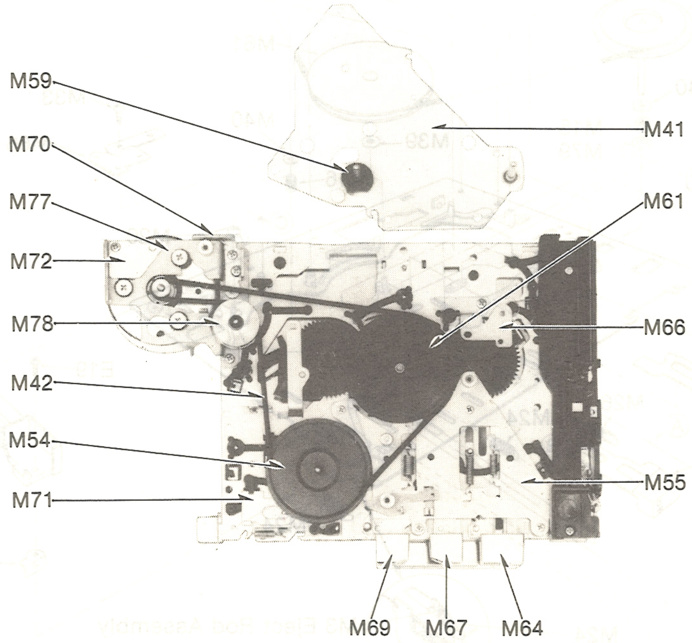
Ref No.	Part No.	Part Name & Description
M 1	QMK1940	Chassis Cover
M 2	QMR1962	Stop Rod-2
M 3	QXR0789	Eject Rod Assembly
M 4	QMR1968	Switch Rod
M 5	QMR1970	Lock Rod
M 6	QML3836	Fast Wind Control Rod
M 7	QBP1937	Cassette Retainer Spring
M 8	QXA1198	Counter Angle Assembly
M 9	QXR0784	Playback Rod Assembly
M 10	QMA4381	Cassette Holding Angle
M 11	QML3844	Switch Arm
M 12	QML3451	Auto-Stop Detection Lever
M 13	QXL1509	Brake Arm Assembly
M 14	QGO1957W	Playback Button
M 15	QBC1403	Flywheel Spring
M 16	QBC1404	Back Tension Spring
M 17	QBN1863	Switch Rod Spring
M 18	QBN1864	Switch Arm Spring
M 19	QBN1865	Auto-Stop Detection Lever Spring
M 20	QBN1866	Brake Arm Spring
M 21	QBN1867	Cue Lever Spring
M 22	QBN1876	Changing Rod Return Spring
M 23	QBT1950	Control Lever Spring
M 24	QBT1951	Rod Spring
M 25	QBT1952	Lock Release Lever Spring
M 26	QBT1954	Playback Rod Spring
M 27	QXL1511	Pressure Roller Arm Assembly
M 29	QTW1274	Insulating Sheet
M 30	XQN16+C3FY	Screw ⊕1.6×3
M 31	XQN16+C5FY	Screw ⊕1.6×5
M 32	QHQ1320	Step Screw
M 33	XTNQ16C3F	Tapping Screw ⊕1.6×3
M 34	XTNQ16C4JFY	Tapping Screw ⊕1.6×4
M 35	XTSQ16A4JFC	Tapping Screw ⊕1.6×4
M 36	XTNQ16C3J	Tapping Screw ⊕1.6×3
M 37	QHQ1293	Head Adjustment Screw
M 38	QBW2030	Nylon Washer
M 39	QBW2010	Poly Washer
M 40	QBW2012	Poly Washer
M 41	QXK2544	Lower Base Plate Assembly
M 42	QDB0315	Flywheel Belt
M 43	QMG0108	Tape Guide
M 44	QBC1339	Head Adjustment Spring
M 45	QBN1861	Playback Spring
M 46	QBN1862	Pressure Roller Spring
M 47	QZM0048	Limitter Plate
M 48	QBW2008	Poly Washer
M 49	XSN2+4	Screw ⊕2×4
M 50	XQS16+A18FC	Screw ⊕1.6×1.8
M 51	XQN16+C18FY	Screw ⊕1.6×1.8
M 52	QTD1302	Wire Clamper
M 53	QXK2546	Head Base Plate Assembly
M 54	QXF0185N	Flywheel Assembly
M 55	QXK2547	Rod Base Plate Assembly
M 56	QXR0781	Control Rod Assembly
M 57	QXL1279N	Takeup Gear Lever Assembly
M 58	QXL1508	Fast Wind Gear Lever Assembly
M 59	QMD0022	Auto-Stop Cam
M 60	QXL1510	Lock Release Lever Assembly
M 61	QXG1064	Main Gear Assembly
M 62	QXD0128	Takeup Reel Table Assembly
M 63	QXD0134	Supply Reel Table Assembly
M 64	QXR0861	Stop Rod Assembly
M 65	QMA4331	Mechanism Holding Plate-A
M 66	QMA4308	Switch Angle
M 67	QXR0862	Rewind Rod Assembly
M 68	QMA4332	Mechanism Holding Plate-B
M 69	QXR0863	Fast Forward Rod Assembly
M 70	QMA4333	Mechanism Holding Plate-C
M 71	QMR1967	Changing Rod
M 72	QMF2233	Stopper
M 73	QBT1953	Eject Lever Spring
M 74	MHE3S3RB	Motor Assembly (with Motor Governor P.C.B)
M 75	QBG1676	Motor Rubber
M 76	QHQ1302	Step Screw
M 77	QXA1200	Motor Holding Plate Assembly
M 78	QXP0631	Pulley
M 79	QBW2102	Washer
M 80	QMA4507	Switch Angle
M 81	XQS16+3	Screw ⊕1.6×3
M 82	XTNQ16A3F	Tapping Screw ⊕1.6×3
M 83	QHQ1333	Step Screw
M 84	QTD1258	Lug Terminal
M 85	QBW2101	Poly Washer

SPECIFICATIONS

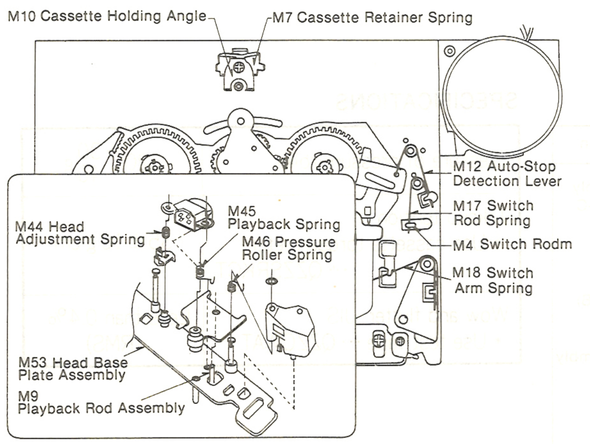
Pressure of pressure roller	220^{+30}_{-40} g
Takeup tension * Use cassette torque meter ··· QZZSRKCT	35±10 g-cm
Wow and flutter: JIS * Use test tape ··· QZZCWAT	Less than 0.4% (RMS)

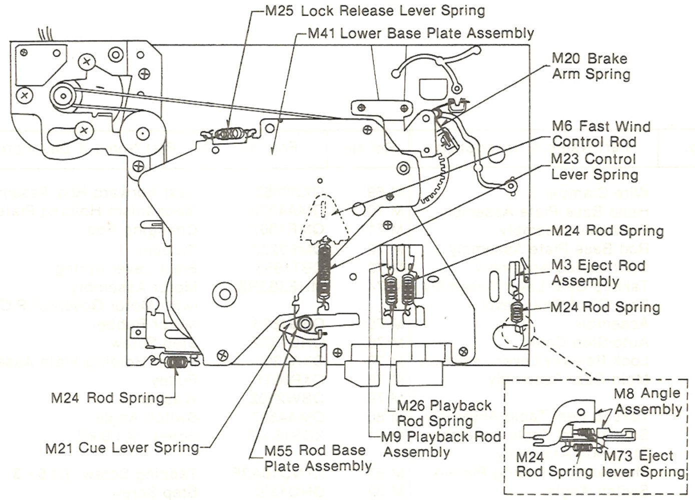
MECHANICAL PARTS LOCATION


M63
M57
M62
M74
M13
M12
M3
M56
M2
M53
M11
M8
M80
M9
M43
M14
M27
M47

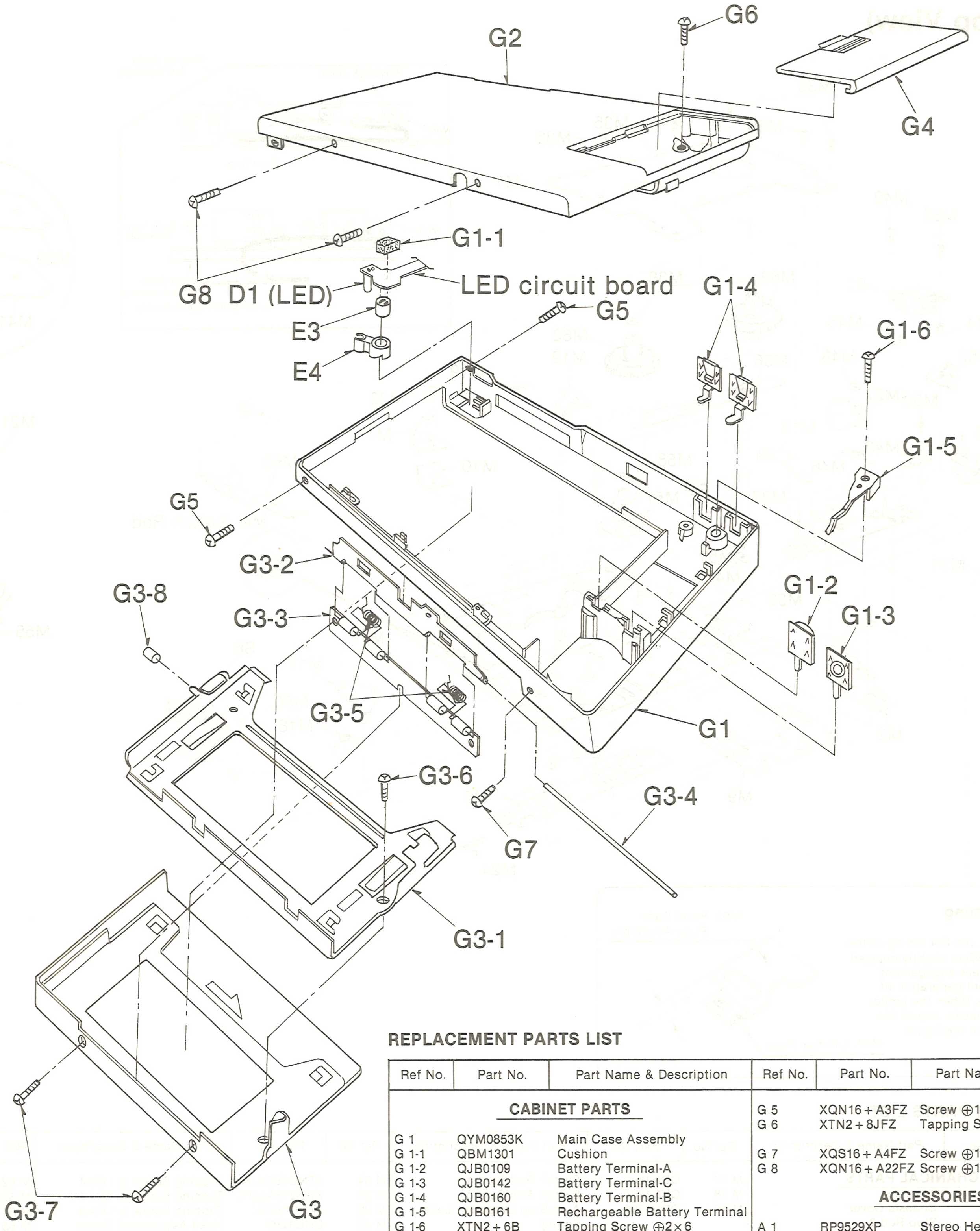

M59
M41
M70
M77
M61
M72
M78
M66
M42
M54
M71
M55
M69
M67
M64

SPRING LOCATION


M10 Cassette Holding Angle
M7 Cassette Retainer Spring
M12 Auto-Stop Detection Lever
M17 Switch Rod Spring
M4 Switch Rodm
M18 Switch Arm Spring
M44 Head Adjustment Spring
M45 Playback Spring
M46 Pressure Roller Spring
M53 Head Base Plate Assembly
M9 Playback Rod Assembly


M25 Lock Release Lever Spring
M41 Lower Base Plate Assembly
M20 Brake Arm Spring
M6 Fast Wind Control Rod
M23 Control Lever Spring
M24 Rod Spring
M3 Eject Rod Assembly
M24 Rod Spring
M24 Rod Spring
M21 Cue Lever Spring
M55 Rod Base Plate Assembly
M26 Playback Rod Spring
M9 Playback Rod Assembly
M8 Angle Assembly
M24 Rod Spring
M73 Eject lever Spring

CABINET PARTS LOCATION


G6
G2
G4
G1-1
G8
D1 (LED)
LED circuit board
G1-4
E3
G5
E4
G1-6
G1-5
G5
G3-2
G3-8
G3-3
G1-2
G1-3
G3-5
G1
G3-6
G3-4
G7
G3-1
G3-7
G3

REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description
		CABINET PARTS
G 1	QYM0853K	Main Case Assembly
G 1-1	QBM1301	Cushion
G 1-2	QJB0109	Battery Terminal-A
G 1-3	QJB0142	Battery Terminal-C
G 1-4	QJB0160	Battery Terminal-B
G 1-5	QJB0161	Rechargeable Battery Terminal
G 1-6	XTN2+6B	Tapping Screw ⊕2×6
G 2	QKM1553K	Bottom Case Assembly
G 3	QYF0572H	Cassette Lid Assembly
G 3-1	QXA1237	Cassette Holder
G 3-2	QKC1091K	Hinge-A
G 3-3	QKC1092K	Hinge-B
G 3-4	QMN8031	Cassette Lid Shaft
G 3-5	QBN7012K	Cassette Lid Spring
G 3-6	XQN16+A16FN	Screw ⊕1.6×1.6
G 3-7	XQS16+A4FZ	Screw ⊕1.6×4
G 3-8	QKJ0524	Collar
G 4	QKF4046K	Battery Cover
G 5	XQN16+A3FZ	Screw ⊕1.6×3
G 6	XTN2+8JFZ	Tapping Screw ⊕2×8
G 7	XQS16+A4FZ	Screw ⊕1.6×4
G 8	XQN16+A22FZ	Screw ⊕1.6×2.2
		ACCESSORIES
A 1	RP9529XP	Stereo Headphones Assembly
A 2	QFK0192	Carrying Bag
A 3	QZC0020	Shoulder Belt
A 4	QQT3366	Instruction Book
		PACKINGS
P 1	QPN4368	Inside Carton
P 2	QPA0649	Cushion
P 3	QPS0604	Pad
P 4	QPC0083	Poly Sheet
P 5	XZB14X25A02	Poly Bag (for UNIT)

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D
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